



## 6. Glossary of Terms

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Unless specified otherwise in the text, the following terms and phrases are defined as follows.

Accretion flows	The local inflows to the Cedar River, including tributary and subsurface inflows, downstream of Landsburg Diversion Dam, at which point most of the City's instream flow commitments will be measured.
Adaptive management	As applied in the HCP, the process of adaptive management is defined with three basic elements: (i) an initial operational decision or project design made in the face of uncertainty about the impacts of the action; (ii) monitoring and research to determine impacts of actions, and (iii) changes to operations or project design in response to new information.
Adfluvial	A fish population or stock that rears as adults in a lake and spawns in a river or tributary of a river.
Alevin	A recently hatched, juvenile salmonid that has not emerged from the gravel and that still has its yolk sac.
Alluvial soils	Soils deposited by running water.
Alpine Fir Forest - mixed	50-70 percent crown closure in "alpine" species; other species present either coniferous or deciduous.
Alpine Fir Forest - Pure	More than 75 percent crown closure in Abies species (Pacific silver fir, noble, or subalpine fir) or mountain hemlock or lodgepole pine.
Anadromous fish	Those species of fish, such as salmon, that hatch and typically rear in freshwater, migrate to the ocean to mature into adults, and return upstream to freshwater rivers, streams, and lakes to spawn.

Applicant	Non-federal landowner who has submitted an application for an Incidental Take permit in accordance with Endangered Species Act. In the case of the Cedar River Municipal Watershed Habitat Conservation Plan, the Applicant is the City of Seattle.
Aquatic habitat	Bodies of water such as rivers, streams, lakes, and wetlands, as defined below.
Bank armoring	Hardening of streambanks to reduce erosion potential using hard (rocks or structures) or soft (biotechnical) engineering techniques.
Basal area	The cross-sectional area of a single tree or of all the trees in a stand measured at breast height, or 4.5 ft above ground. This is usually expressed in square ft per acre and is measured outside the bark.
Bedload	Substrate that is too heavy to stay suspended in water and is transported along the bottom of the stream by bouncing, rolling, or sliding.
Best Management Practices (BMPs)	Methods, measures, or practices designed to reduce adverse impacts, usually applied as a system of practices rather than a single practice.
Biodiversity	Biological diversity; the ensemble and the interactions of the natural genetic, the species, and the ecological diversity in a given place at a given time.
Biodiversity Pathways	An integrated series of management actions designed for sustainable, joint production of commodities and ecological goods and services (from viable populations of wildlife to carbon sequestration.)
Biological legacies	Features of a previous forest that are retained at timber harvest or left after natural disturbances, including large old-growth or other snags, stumps, live trees, logs, soil communities, hardwood trees, and shrubs.
Blowdown	Trees felled by high wind.
Bog	A hydrologically isolated, low nutrient wetland that receives its water from precipitation only. Bogs typically have no inflow and rarely have outflows, and have specially adapted vegetation such as sphagnum moss, Labrador tea, bog laurel, sundews, and some sedges. Bogs may have an overstory of spruce, hemlock, cedar, or other tree species, and may be associated with open water bodies.

Broodstock	Adult fish used for breeding in a hatchery.
Buffer	A forested strip left or treated differently during timber harvest to protect sensitive ecosystems (e.g., streams, wetlands, and old growth) or fish or wildlife habitat. Management activities such as planting or thinning may be allowed in buffers if they are consistent with the conservation objectives for the buffer.
Candidate species, federal	Any species being considered by the Secretary of the Interior or the Secretary of Commerce for listing as a threatened or endangered species under the Endangered Species Act, as amended, but not yet the subject of a proposed rule.
Candidate species, state	Wildlife species that is under review by Washington Department of Fish and Wildlife for possible listing as endangered, threatened, or sensitive when sufficient evidence suggests that its status may meet criteria defined for endangered, threatened, or sensitive in WAC 232-12-297. Candidate species are designated in WDFW Policy POL-M6001.
Canopy	The cover of branches and foliage formed collectively by the crowns of trees or other growth. Also used to describe layers of vegetation or foliage below the top layer of foliage in a forest, as when referring to the multi-layered canopies or multi-storied conditions typical of ecological old-growth forests.
Canopy closure	The degree to which the boles, branches, and foliage (canopy) blocks penetration of sunlight to the forest floor or obscures the sky; determined from measurements of density (percent closure) taken directly under the canopy.
Carabid (beetle)	Predaceous ground beetles from the family Carabidae, a large family of beetles. Many feed on pest species.
Carrying capacity	The maximum number of organisms that can be sustained in a given area of habitat.
Catastrophic event	A large-scale, high intensity natural or human-caused disturbance that occurs infrequently, such as insect or disease outbreaks, extraordinary flooding, or severe fire, that would require action to protect drinking water quality, protect public safety, and prevent significant damage to natural resources.
Catastrophic salvage	The removal of trees for sale from an area or areas of forest that experienced a catastrophic event.

Cavity tree	A tree or snag with holes or openings caused by fire, rot, limb or breakage, or excavated by birds. Such trees are for roosting, reproduction, and foraging by birds and mammals.
Cedar River Basin	The entire area that drains into the Cedar River above Lake Washington.
Cedar River Municipal Watershed	The Cedar River Municipal Watershed, an administrative unit of land; the 90,546-acre municipal watershed within the upper part of the Cedar River Basin, upstream from the City's water intake at Landsburg Diversion Dam. It is comprised of eight major subbasins and 27 subbasins, 26 of which drain into the Cedar River. It supplies about 2/3 of the drinking water to Seattle Public Utilities' water service area.
Char	Fish in the family Salmonidae that belong to the genus <u>Salvelinus</u> . For example, bull trout is a char.
City, the	The City of Seattle.
Clearcut	A silvicultural system and type of regeneration harvest that is widely used in the Pacific Northwest. It involves removal of nearly all standing trees within a given harvest area. This system focuses on promoting regeneration of species which thrive in full sunlight. It is also the most efficient and economical method of harvesting timber. As defined by Forest Practices Rules (1995), "...a harvest method in which the entire stand of trees is removed in one timber harvesting
Clearcut (continued)	operation. Except as provided in WAC 222-30-110, an area remains clearcut until: It meets the minimum stocking requirements under WAC 222-34-010(2) or 222-34-020(2); and the largest trees qualifying for the minimum stocking levels have survived on the area for five growing seasons or, if not, they have reached an average height of four feet."
Coarse woody debris	Large pieces of wood in forests, including logs (down dead trees), pieces of logs, large branches, stumps, and snags (standing dead trees). Provides valuable habitat for many kinds of animals and contributes significantly to biodiversity of conifer forests.

Commercial thinning	As used in this HCP, the silvicultural practice applied on Matrix lands (those available for commercial harvest) that removes excess trees from overstocked, merchantable second-growth stands (usually over 30 years old), including the removal of weak, diseased, and dying trees. The primary intent of this practice is to provide revenue while maintaining or improving the growth, health, and wind-firmness of the leave trees by assuring adequate growing space and crown area, and improving stand vigor. Compared to conventional commercial thinning, the commercial thinning described in this HCP will also have the objectives of developing a high level of vertical and horizontal stand structure, accelerating development of mature stand characteristics, developing a heterogeneous understory, and recruiting large snags and down logs as coarse woody debris in older stands. These stand characteristics will be fostered by multiple thinning entries and longer (120-140 year) regeneration harvest rotations. See Figure G-1.a for illustration.
Commercial timber harvest zone	Matrix lands; that portion of the Cedar River Watershed land base that is not a part of the Ecological Reserve from which second-growth trees will be harvested for revenue.
Commission, the	Cedar River Instream Flow Oversight Commission, to be established as part of the HCP pursuant to the Instream Flow Agreement.
Competitive exclusion	A phase in which the canopy closes and competition among trees becomes intense in a developing stand. Also sometimes called stem exclusion.
Compliance monitoring	Monitoring performed to determine whether HCP programs and elements are implemented as written.
Compliance point	The location(s) in the Cedar River at which measurements are made to assure compliance with instream flow and flow downramping rate requirements.
Component	Refers to one of the four major types of commitment in the HCP: watershed management, anadromous fish mitigation, instream flows, or monitoring and research.
Conifer Forest-Mixed Species	Less than 50 percent of crown closure classified in any conifer species type, but coniferous species must constitute 50 percent or more of the total crown closure.

Connectivity	A measure of the extent to which conditions between different areas of similar or related habitat provide for successful movement of fish or wildlife species, supporting populations on a landscape level.
Conservation strategy	A collective set of measures to avoid, minimize, or mitigate the potential take (or equivalent of take) of species addressed by the HCP, or for protecting, rehabilitating, enhancing, or restoring habitats for these species.
Contiguous habitat	Habitat that is distributed continuously or nearly continuously across the landscape.
Critical flows	The minimum instream flows (cfs) maintained in the Cedar River below the Landsburg Diversion Dam to protect habitat conditions for anadromous fish under very adverse and infrequent hydrologic conditions (on average, one-in-ten years). Critical instream flows are lower for most periods of the year than normal flows, which are provided, on average, nine-in-ten years.
Critical habitat	Areas designated under the federal Endangered Species Act, defined as “specific areas with the geographic area occupied by the species, at the time it is listed . . . on which are found those physical or biological features (I) necessary to the conservation of the species and (II) which may required
Critical habitat (continued)	special management considerations or protection; and . . . specific areas outside the geographic area occupied by the species, at the time it is listed . . . upon a determination . . . that such areas are essential for the conservation of the species.”
Critical habitat unit (CHU)	Units of critical habitat; see also Northern Spotted Owl CHU.
Crown closure	See “Canopy closure.”
Crown Competition Factor	An index of tree canopy closure. An open grown stand with crowns barely in contact with each other has a CCF of 100. At CCF 300, some stand mortality can occur (because of competition for light, water, and nutrients), but growth still exceeds mortality.
Culmination of Mean Annual Increment	The point in stand development at which average growth (production) of the stand peaks.
Cutslope	An over-steepened slope face created by excavating into a hillside, such as during road construction .

Dead storage	The water in Chester Morse Lake below a depth of 1532 ft, which is the natural gravity outlet of the lake.
Debris flow	A moving mass of rock fragments, soil, and trees, with a high volume of water that can travel at speeds greater than 60 mph and travel long distances down steep confined mountain channels. Typically caused by storm events.
Decommissioning	Roads are left in a condition suitable to control erosion and maintain water movement. Methods of decommissioning include removal of bridges, culverts, and fills in accordance with WAC 222-24-050.
Dewatering (of redds)	A condition in which water flows are decreased to a level where redds (nests of salmonid eggs) are exposed.
Diameter at breast height (dbh)	The diameter of a tree, including bark, measured 4.5 ft above the ground on the uphill side of the tree and measured in inches.
Discretionary water	As used in the HCP, water volumes or flows that can be provided, at the discretion of the City, to increase instream flows for fish at different times when it is needed, typically as recommended by the Cedar River Instream Flow Oversight Committee.
Dispersal	The movement of juvenile, subadult, or adult animals from one sub-population to another. Individuals may disperse for foraging, breeding, and other reasons.
Distribution (of a species)	The spatial arrangement of individuals of a species within its range.
Disturbance	Significant change in forest structure or composition through natural events (such as fire, flood, wind, earthquake, or disease) or human-caused events (forest management).
Dog-hair stand	An over-stocked, closed-canopy stand with little or no understory vegetation because of a lack of light penetration, and where growth is suppressed. Typically less than 30 years old, but can be older.
Douglas Fir Forest - Mixed	50 to 70 percent crown closure in Douglas fir; other species present either coniferous or deciduous.
Douglas Fir Forest - Pure	More than 75 percent crown closure in Douglas fir (clearly dominant); other species present either coniferous or deciduous.

Downramping	Reductions in instream flows as a result of changes in water or hydroelectric facility operations, most often expressed as a rate of drop of river water elevation in inches per hour.
Early seral – grass forb stage	Very recently harvested or disturbed forest habitat characterized by dominance of grasses and other non-woody vegetation, defined in this HCP as such habitat that is 0-9 years of age.. Tree seedlings are present, but not dominant, and shrubs can be present.
Early seral – open canopy stage	Recently harvested or disturbed forest habitat dominated by young trees (saplings) and shrubs, defined in this HCP as such habitat that is 10-29 years of age. Canopy closure is typically less than 60%.
Ecological Reserve	Also Reserve. An area in the Cedar River Municipal Watershed designated for protection in the HCP, or about 64% of the land in the watershed. Included in the Reserve are all existing old-growth forest; all mapped wetlands, lakes, and ponds; streams; riparian habitat; headwall basins, sensitive soils, and inner gorges; extensive areas of second-growth conifer forest; the entire Spotted Owl Critical Habitat Unit (CHU); meadow and wetland complexes; special habitats, such as meadows and cliffs; and additional areas to provide landscape functionality and connectivity. Activities not allowed in the Reserve include harvest of existing old-growth or late-successional forest and timber harvest for commercial purposes. Activities allowed include limited restoration or ecological thinning, and restoration planting to accelerate redevelopment of old-growth conditions and/or restore riparian function.



Ecological thinning	As used in this HCP, the experimental silvicultural practice applied in the Reserve of cutting, damaging, or otherwise killing some trees from some areas of older, overstocked, second-growth forest (typically over 30 years old). The intent of ecological thinning is to encourage development of the habitat structure and heterogeneity typical of late-successional and old-growth stands, characterized by a high level of vertical and horizontal stand structure, and to improve habitat quality for wildlife. It is expected that techniques will include variable-density thinning to create openings, develop a variety of tree diameter classes, develop understory vegetation, and recruit desired species; and creating snags and logs by uprooting trees, felling trees, topping trees, injecting trees with decay-producing fungus, and other methods. Ecological thinning does not have any commercial objectives. However, in those cases in which an excess of woody material is generated by felling trees, trees may be removed from the thinning site and may be sold or used in restoration projects on other sites. See Figure G-1.b for illustration.
Ecosystem	A natural system comprised of component organisms interacting with their environment.
Ecosystem management	A strategy or plan to provide for the needs of organisms associated with an ecosystem, typically focusing on management of habitat.
Edge habitat	An area where different ecological communities meet or where different successional stages or vegetative conditions within communities come together. Also, as used in the context of instream flows, that portion of a stream nearest to the wetted margins of the active stream channel.
Effectiveness monitoring	Monitoring to determine whether implemented HCP conservation strategies result in anticipated habitat conditions or effects on species.
Element	A feature of a component. For example, a fish ladder would be an element of the anadromous fish mitigation component.
Emergent surfaces	Those portions of objects that protrude above the surface of the water (e.g., logs). May be important for some species as an egress from the water.

Emergent vegetation	Aquatic plants that are only partially submerged, and are typically rooted in the aquatic environment with the majority of photosynthesis occurring above the surface of the water (e.g., cattails).
Endangered species, federal	A designation as defined in Section 3 of the federal Endangered Species Act for a species in danger of extinction throughout all or a significant portion of its range.
Endangered species, state	A wildlife species native to the state of Washington that is seriously threatened with extinction throughout all or a significant part of its range within the state. State endangered species are legally designated in WAC 232-12-014 and defined in WAC 232-12-297 Section 2.4.
Entrainment	To draw in and transport by the flow of a fluid. For example, some fish are likely entrained into the penstocks of the Cedar Falls Powerhouse through the intake structure.
Environmental Assessment (EA)	A formal document prepared under the National Environmental Policy Act to assess the effects that a particular action will have on the environment.
Environmental Impact Statement (EIS)	A document prepared under the State Environmental Policy Act to systematically analyze the effects that site-specific activities will have on the environment.
Escapement	The number of adult fish returning to spawn after harvest. Escapement goals are often established by fisheries managers.
Even-aged forest	A forest stand with minimal differences in age, generally less than 10 years, between trees.
Felsenmeer	Broken and fragmented rock, often in angular blocks, formed on gentle mountain slopes through weathering processes, particularly freezing and thawing.
Firm block (of water)	As part of the instream flow regime, a specified volume of water (2,500 acre feet) that the City would provide, as a commitment, between June 17 and August 4 in most normal years to supplement the required minimum instream flows in a manner that benefits anadromous fish.
Fish ladder	A structure typically used to allow passage of adult fish upstream over barriers that block their migration.
Fish screens	Screens installed on water intakes to reduce juvenile and adult fish entrainment and injury from impingement.

Fish weir	A fence or enclosure set in a waterway for blocking fish passage or capturing fish.
Flow stable mode	An operational mode for a hydroelectric project that maintains stable flow downstream of the project, such that the project does not peak (fluctuate flow) with electrical load (demand).
Forest succession	The sequential change in composition, abundance, and patterns of species that occurs as a forest matures after an event in which most of the trees are removed. The sequence of biological communities in a succession is called a sere, and the are called seral stages.
Fry	A free-swimming, juvenile salmonid that has recently emerged from the gravel and has fully absorbed its yolk sac.
Full suspension yarding	Transport of logs to a landing without either end of the log touching the ground. Typically, this is accomplished with cable systems or helicopters.
Geographic Information System (GIS)	A computer system for collecting, storing, retrieving, transforming, displaying, and analyzing spatial or geographic data, linking areas or map features with associated attributes for a particular set of purposes, including the production of a variety of maps and analyses.
Glacial moraine	As used in the HCP, a deposit of sediment at the advancing front edge of a glacier. A glacial moraine is deposited wherever a glacier pauses, marking the farthest extent of the end of the advance, and is often crescent shaped. Sediment may also be deposited laterally.
Green recruitment tree	As defined in WAC 222-16-010, those live trees that remain after harvest for the purpose of becoming future wildlife reserve trees under WAC 222-30-020(11).
Green tree	A living and growing tree.
Green tree retention	A stand management practice in which live trees are left within harvest units to provide habitat components (such as spatial and structural diversity and connectivity).
Habitat	The sum total of environmental conditions of a specific place occupied by plant or animal species or a population of such species. A species may require or use more than one type of habitat to complete its life cycle.

Habitat conservation plan (HCP)	As defined under Section 10 of the federal Endangered Species Act, a plan required for issuance of an incidental take permit for a listed species. Called “conservation plans” under the Act, HCPs can address multiple species, both listed and unlisted, and can be long term. HCPs provide for the conservation of the species addressed, and provide certainty for permit applicants through an implementation agreement between the Secretary of the Interior or Secretary of Commerce and a non-federal entity.
Half-pounder	Steelhead that, during their initial ocean residence, grow to an average weight of one-half pound.
Hardwood Forest - Mixed	50 to 70 percent crown closure in deciduous species (red alder, black cottonwood, or bigleaf maple); other species present either coniferous or deciduous.
Hardwood Forest - Pure	More than 75 percent crown closure in deciduous species (red alder, black cottonwood, or big leaf maple); other species present either coniferous or deciduous.
Harm	A form of take under the federal ESA; defined in federal regulations as an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation where it actually kills wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3).
HCP year 1	That period of time through the end of the first full calendar year following the effective date of the HCP.
Headwall	Very steep, concave portions of the headwaters of a stream, including tops of rock ledges and areas of a basin that are usually wet and unstable.
Headwaters	The source of a stream or stream system.
High-normal flows	The high part of the normal minimum instream flow curve, for flows in the Cedar River below the Landsburg Diversion Dam, during the period between October 8 and December 31 for some normal years. The applicability of this curve in any given year is based upon storage and hydrologic conditions prevailing each fall and is determined by specific flow-switching criteria and procedures. High-normal flows are intended to provide more beneficial habitat conditions for anadromous fish in the fall than low-normal flows or critical flows.

Hydroacoustic surveys	A method for underwater assessment of fish using an echolocator (device that uses sound to locate objects).
Hydrograph	Graphical relationship of stream discharge (rate of flow) plotted against time.
Hydrologic	Pertaining to the cycling, movement, distribution, and properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.
Hydrologic maturity	The state of forest vegetation whereby vegetative water usage and the effect of forest on hydrology are similar to that of unharvested forest vegetation. As defined in the HCP, hydrologically mature vegetation has a canopy closure of 70 percent or more, and a diameter (dbh) of 9 inches or more.
Implementation Agreement	A part of the application for an incidental take permit for an approved HCP, an agreement that specifies the terms and conditions, resources, schedule of activities, and expectations for the parties to the agreement.
Implementation monitoring	Compliance monitoring; monitoring to determine whether the HCP conservation strategies are implemented as written.
Incidental take	As defined by the Endangered Species Act, the taking of federally listed animal species, if the taking is incidental to, and not the purpose of, carrying out otherwise lawful activities. See also "Take."
Incidental Take Permit	A permit issued by the U.S. Fish and Wildlife Service or National Marine Fisheries Service to a non-federal entity that allows the incidental take of a threatened or endangered species; requires the permittee to carry out specified actions that minimize and mitigate the impacts of the incidental take to the maximum extent practicable, and in a manner that does not appreciably reduce the likelihood of survival or recovery of the species in the wild.
Infectious Hematopoietic Necrosis Virus (IHNV)	A viral pathogen present in nearly all populations of sockeye salmon, and some populations of steelhead trout and chinook salmon, that causes the potentially fatal disease Infectious Hematopoietic Necrosis.
Inner gorges	Deeply incised stream channels with steep side slopes, with high mass-wasting hazard (landslide potential).
Intakes	Structures through which water from the reservoir or river are taken into the City's hydroelectric generation and water supplies facilities; includes the penstocks and the Howell-Bunger valve.

Interior forest conditions	Forest conditions that are largely not affected by edge effects, which occur where large openings abut the forest. Edge effects that are known to occur in some areas include penetration of light and wind, temperature changes, and increased predator activity. Interior forest conditions are achieved at sufficient distance from an edge so that edge effects are minimal.
Inundation	The condition whereby shorelines, streams, or vegetation are flooded by elevated water levels. When the inundating waters cover an area that had flowing water, such as the lower reach of a stream above a lake, inundation can result in increased sedimentation and decreased oxygen levels within the substrate.
Iteroparous	In general, applies to species in which individuals breed more than once in their lifetimes. Applies to salmonids that can survive initial spawning to spawn again in subsequent seasons. Resident trout and many individual anadromous steelhead trout are iteroparous, whereas salmon are semelparous (spawning only once).
Kelt	A maiden salmonid that survives its first spawning and returns to the sea.
Key habitat	Habitat that is utilized by and often required for a species for breeding or rearing or both.
Lake	A body of open water greater than 20 acres in area and at least 6.6 ft deep at low water.
Lake Washington Basin	The entire area draining into Lake Washington. Also known as the Lake Washington Watershed.
Landsburg Diversion Dam	Low dam at the site of the diversion for uptake of drinking water operated by Seattle Public Utilities, located at River Mile 21.8 of the Cedar River. As a run-of-the-river dam, it does not create a significant impoundment of water upstream. Also referred to as Landsburg Dam.
Landsburg Drainage Subbasin	The 79,951 acres of land within the hydrographic basin of the Cedar River Watershed that drains into the Cedar River above the Landsburg Diversion Dam. The City owns all but 499 acres of this subbasin.
Landscape	A large regional unit of land that typically includes a mosaic of biological communities.

Large woody debris (LWD)	Large pieces of wood in or partially in stream channels, including logs, pieces of logs, root wads of trees, and other large chunks of wood. LWD provides streambed and bank stability and habitat complexity. Often called coarse woody debris when within forests.
Late-successional forest	Forest in the later stages of forest succession, the sequential change in composition, abundance, and patterns of species that occurs as a forest matures. As used in the HCP, refers to conifer forests 120-189 years of age. Characterized by increasing biodiversity and forest structure, such as a number of canopy layers, large amounts of coarse woody debris, light gaps (canopy openings), and developed understory vegetation.
Lentic systems	Standing waters, such as lakes, ponds, and some wetlands.
Listed wildlife species, federal	Under the federal Endangered Species Act, species, or sub-unit of a species, formally listed in the Federal Register as endangered or threatened by the Secretary of the Interior or the Secretary of Commerce. A listing refers to the species or sub-unit by scientific and common name and specifies over what portion of its range it is endangered or threatened.
Listed wildlife species, state	Wildlife species that are classified as endangered, threatened, or sensitive under Washington State law. Defined in WAC 232-12-297.
Littoral zone	The shallow region of a lake or pond, to a depth of about 3 ft, which may have highly productive emergent macrophytes (large plants) that utilize the resources of both the terrestrial and aquatic habitats.
Live-box traps	A holding pen used in conjunction with fish traps; the trap captures the fish and the live-box holds them until removal.
Log	A down tree, or tree segment, lying on or near the ground. Logs provide valuable habitat for wildlife. Also, a segment of a harvested tree that may be suitable for lumber and other products.
Lotic systems	Flowing waters such as streams and rivers.
Long rotation	For this HCP, the relatively advanced age at which stands will be harvested in the commercial zone over the long term (120 years for Douglas-fir stands and 140 years for true fir stands). Typical rotation ages (ages at harvest) for private lands in the region vary from 40 to 60 years)

Lower Municipal Watershed	That area of the Cedar River Municipal Watershed generally west and south of Cedar Falls which largely drains to the mainstem of the Cedar River downstream of Masonry Dam.
Low-normal flows	The low part of the normal minimum instream flow curve, for flows in the Cedar River below the Landsburg Diversion Dam, during the period between October 8 and December 31 for some normal years. The applicability of this curve in any given year is based upon storage and hydrologic conditions prevailing each fall and is determined by specific flow-switching criteria and procedures. Low-normal flows are intended to provide more beneficial habitat conditions for anadromous fish in the fall than critical flows.
Mainstem	The primary stream channel of a river into which tributaries flow, extending from the mouth of the river to its furthest headwater.
Management prescriptions	A set of procedures designed to accomplish a specific management objective.
Marbled murrelet	<i>Brachyramphus marmoratus</i> . A Pacific seabird that typically nests in mature or old-growth forests within 50 miles of the marine environment; listed as a federal and state threatened species.
Mass wasting	Landslide; dislodgment and downslope transport of a single block of soil, rock, and vegetation resulting from the interaction of water and gravity on slopes. Occurs naturally in forested environments, but can be caused and made worse by disturbances such as poorly constructed forest roads.
Matrix	As used in the HCP, commercial harvest zone, or the area in which timber can be harvested for revenue.
Mature Forest	Forest that is entering later stages of forest succession. As used in the HCP, refers to conifer forests 80-119 years of age. While less so than late-successional forest, mature forest is characterized by increasing biodiversity and forest structure, such as a number of canopy layers, large amounts of coarse woody debris, light gaps (canopy openings), and developed understory vegetation.
Mid seral – closed canopy stage	Forest that is in the middle stage of a sere, or sequences of ecological communities in a forest succession. As used in the HCP, refs to conifer forest that is 30-79 years of age, in which the forest canopy is relatively closed, allowing little light penetration and understory development.



Mitigation	Methods of reducing adverse impacts of a project by (1) limiting the degree or magnitude of the action and its implementation; (2) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (3) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or, (4) compensating for the impact by replacing or providing substitute resources or environments.
Monitor species	Taxa of potential concern; a term frequently used to describe status, but not a legal designation; species native to the state of Washington that: (1) were at one time classified as endangered, threatened, or sensitive; (2) require habitat that has limited availability during some portion of its life cycle; (3) are indicators of environmental quality; (4) require further field investigations to determine population status; (5) have unresolved taxonomy which may bear upon their status classification; (6) may be competing with and impacting other species of concern; or (7) have significant popular appeal.
Monitoring	The process of collecting information to evaluate if objectives and anticipated results of a management plan are being realized or if implementation is proceeding as planned. This may include assessing the effects upon a species' habitat or non-organic components of the watershed, such as accretion flows.
Moraine	See "Glacial moraine."
National Environmental Policy Act (NEPA)	A law passed in 1969 that requires all federal agencies to consider and analyze all significant environmental impacts of any action proposed by those agencies, to inform and involve the public in the agency's decision-making process, and to consider the environmental impacts in the agency's decision-making process.
National Marine Fisheries Service (NMFS)	A branch of the National Oceanic and Atmospheric Administration, Department of Commerce, which is the listing authority for marine mammals and anadromous fish under the Endangered Species Act.
Native species	Any wildlife species naturally occurring in Washington for purposes of breeding, resting, or foraging, excluding introduced species not found historically in this state; defined by WAC 232-12-297.

Natural Heritage Program	A Washington Department of Natural Resources program that identifies, selects, and nominates outstanding natural areas in Washington State; also, oversees state listing of plants.
New forestry	Timber harvest methods that are intended to sustain the ecological functions of the forest by carrying over key elements (biological legacies) of the previous forest, including live trees, snags, down wood, and other ecologically important elements of the mature forest; developed as an alternative to traditional industrial clearcut harvesting.
Non-firm block (of water)	As part of the instream flow regime, a specified volume of water (3,500 acre feet) that the City would provide, as a goal, between June 17 and August 4 in most normal years to supplement the required minimum instream flows in a manner that benefits anadromous fish.
Non-native species	Those animal and plant species that were not originally in a specific geographic area, but have been introduced, either intentionally or unintentionally, by humans.
Normal flows	The minimum instream flows (cfs) maintained in the Cedar River below the Landsburg Diversion Dam to provide beneficial habitat conditions for anadromous fish under other than conditions triggering critical flows. Normal instream flows which are provided, on average, nine-in-ten years, are higher for most periods of the year than critical flows. During the fall there are two normal flow regimes, high normal and low normal, which are provided under different hydrologic conditions.
Northern spotted owl	<i>Strix occidentalis caurina</i> . A medium-sized, dark brown owl native to the Pacific coastal region that primarily nests and lives in old-growth forest; federally listed as a threatened species and listed as endangered by Washington State.
Northern Spotted Owl Critical Habitat Unit (CHU)	Area designated by the USFWS in 1991 (Fed. Reg. Vol. 57, Pp. 1796-1838) to protect remaining critical late-successional and old-growth forest habitat (and other areas) for the northern spotted owl and to reduce fragmentation. One of these units, WA-33, overlaps 22,845 acres of habitat in the eastern portion of the Cedar River Municipal Watershed and will be protected within the Ecological Reserve.
Northern spotted owl site center	The location of status 1, 2 or 3 northern spotted owls, based on the definitions from WAC 222-16-010 (see Appendix 24).

Occupied marbled murrelet site	Areas used by marbled murrelets for nesting, as defined in WAC 222-16-010 (see Appendix 24).
Old-growth conditions	Conditions in conifer forest stands, with vertical and horizontal structural attributes sufficient to maintain some or all of the ecological functions of natural old-growth forest, which is typically at least 200 years old.
Old-growth forest	As used in the HCP, native, unharvested conifer forest in the Cedar River Municipal Watershed that is at least 190 years of age.
Open water bodies	All lakes and ponds of any size without forest canopy above.
Out-migrant	A juvenile fish that is migrating from one rearing environment to another.
Overlay analysis	The process of stacking digital representations of various spatial data on top of each other so that each position in the area covered can be analyzed and evaluated in terms of these combined data.
Palustrine emergent wetlands	Palustrine wetlands characterized by erect, rooted, herbaceous hydrophytes (plants adapted to water or waterlogged soils), excluding mosses and lichens, which are present for most of the growing season in most years. Includes wetlands often referred to as marshes and wet meadows.
Palustrine forested wetlands	Palustrine wetlands characterized by woody vegetation that is 20 ft tall or taller (trees).
Palustrine scrub-shrub wetlands	Palustrine wetlands dominated by woody vegetation less than 20 ft tall (shrubs and shrubby trees).
Palustrine wetlands	Freshwater (non-marine) wetlands dominated by trees, shrubs, persistent emergents, or emergent mosses or lichens, and wetlands lacking vegetation that have an area of less than 20 acres and are no deeper than 6 ft; palustrine wetlands include marshes, swamps, bogs, and fens.
Parr	A juvenile salmonid rearing in fresh water at the stage at which it has developed parr marks before it reaches the smolt or sub-adult stage.
Parr marks	The vertical markings on a juvenile salmonid.
Pelagic zone	The open, mid-column zone in a body of water that is not associated with shoreline or shallow depths.
Penstocks	Large pipes that carry water from Masonry Dam to the Cedar Falls Powerhouse, for operation of hydroelectric turbines.

Persistent emergent vegetation	Erect, rooted, herbaceous vascular plants that may be temporarily to permanently flooded at the base but do not tolerate prolonged inundation of the entire plant, and that normally remain standing at least until the beginning of the next growing season.
Pole	A young tree, from the time its lower branches begin to die until the time the rate of crown growth begins to slow and crown expansion is noticeable. For the classification system used in the HCP, includes trees from 5.01 to 11.0 inches dbh.
Polygon	A GIS term for a multi-sided figure that has area and which represents a habitat unit, man-made structure, or other spatial entity on a map.
Pond	A body of open water from 0.5 to 20 acres in area and at least 6.6 ft deep at low water.
Precommercial thinning	A silvicultural treatment applied on Matrix lands (those available for commercial timber harvest) that involves cutting, girdling, or otherwise killing excess trees from young (usually 10 to 30 year-old), overstocked stands to reduce competition and encourage better growth. This silvicultural practice also accelerates the development of mature stand characteristics, reduces the amount of time a stand remains in the stem exclusion stage (a stage characterized by minimal light penetration and low biological diversity), protects water quality by reducing the risk of large scale catastrophic damage to the watershed (primarily through development of windfirmness and increased resistance to insect attack), and improves overall health and vigor of the leave trees. Precommercial thinning is used to produce, over time, an increase in the stand's usable volume in preparation for commercial harvest. See Figure G-1.c for illustration.
Probable maximum flood (PMF)	A flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in the drainage basin under study.
Profundal zone	The deeper sediment bottoms of a body of water which is free of vegetation.
Proposed threatened or endangered species, federal	Species formally proposed in the Federal Register by the Secretary of Interior or the Secretary of Commerce for listing as threatened or endangered under the federal Endangered Species Act; not a final designation.

Puncheon, wood	A drainage structure constructed of wood, usually logs, placed beneath the surface of a road in two or more layers (first perpendicular to the road, then longitudinally) to facilitate the passage of water under the road, while supporting the road and traffic.
Rain-on-snow zone	The area where several times during the winter the snowpack is partially or completely melted during warm periods and/or rainstorms.
Rattlesnake Lake Viewshed	Rattlesnake Lake and the land immediately surrounding, including Rattlesnake Ledge, that has been set aside for public usage.
Reach	See “Stream reach.”
Rearing habitat	Areas in rivers, streams, ponds, or lakes, where juvenile salmon and trout find food and shelter to live and grow.
Redd	A salmonid fish’s nest, which is created by excavating a shallow pit in gravel where eggs are buried for incubation.
Regeneration harvest	A general term for silvicultural systems that involve removal of most trees within a harvest area for the purpose of stand regeneration. (Regeneration harvest systems return the stand to an early stage of forest succession.) Such systems are commonly used for commercial timber harvest in the Pacific Northwest and include clearcutting, shelterwood harvest, seed tree harvest, and retention harvest (see definition).
Remote sensing	Information acquired by indirect means, such as by satellite or airplane.
Reservoir	As used in the HCP, the Chester Morse Lake/Masonry Pool complex; also referred to as the reservoir complex.
Restoration planting	Planting of native trees, shrubs, and other plants to encourage development of habitat structure and heterogeneity, to improve habitat conditions for fish and wildlife, and to accelerate development of old-growth conditions or riparian forest function in previously harvested second growth.
Restoration thinning	As used in this HCP, a silvicultural intervention strategy applied in the Ecological Reserve in areas of young (usually 10 to 30 year-old) over-stocked forest with the intent of increasing biological diversity and wildlife habitat potential, accelerating the development of mature forest characteristics, and minimizing the amount of time a stand remains in the stem exclusion stage (a stage characterized by minimal light

Restoration thinning (continued)	penetration and low biological diversity). This strategy protects water quality by reducing the risk of large scale catastrophic damage to the watershed (primarily through development of windfirmness and increased resistance to insect attack, which is exacerbated by the stress on intense competition among trees). Techniques for restoration thinning include cutting, girdling, or otherwise killing some trees in variable density thinning patterns, retaining a mix of species that is characteristic of natural site conditions, and leaving small gaps or openings characteristic of naturally regenerated forests that result from small natural disturbances such as wind or disease. See Figure G-1.d for illustration.
Retention harvest	As used in this HCP, a type of regeneration harvest applied on Matrix lands (those available for commercial harvest). Compared to traditional clearcutting, retention harvest entails retaining more trees per acre than required by Washington State Forest Practice Rules. As applied in the HCP, the intent of this method is to achieve an average 20% volume retention goal that includes retaining biological legacies such as remnant older trees, other green trees, previously unmapped forested wetlands, and inoperable patches of forest. Retention harvest also focuses on protection of other biological legacies, such as shrubs, snags, logs, understory vegetation, and soil microorganisms. This harvest is intended to provide revenue while promoting structural and biological diversity characteristic of naturally regenerated stands. Trees may be retained in either dispersed or clumped patterns. See Figure G-1.e for illustrations.
Revised Code of Washington (RCW)	A revised, consolidated, and codified form and arrangement of all the laws of the state that are of a general and permanent nature.
Riparian habitat	Habitat along lakes, rivers, and streams where the vegetation and microclimate are influenced by year-round or seasonal water and associated high water tables.
Riparian zone	A zone adjacent to lakes, ponds, rivers, and streams where the microclimate, soil, and vegetation are typically, although not always, influenced by surface water and associated groundwater; this area forms an interface between the aquatic environments and adjacent terrestrial habitats and includes riparian habitat. Wetlands may or may not be located within this zone, and vegetation in a riparian zone may or may not include true riparian habitat.

River mile (RM)	Statue mile as measured along the center line of a river. River miles (RM) are measured upstream from the mouth of a river (e.g., RM 18.5), but can also used as a discrete measure of distance in a river or stream (e.g., 1-3 river miles).
Rotation	The number of years required to grow a stand to a desired size or maturity before harvest. Rotation age is the typical age of a stand at harvest in a particular harvest management regime.
Salmonids	Fish species belonging to the family Salmonidae, including trout, salmon, char, and whitefish species.
Sapling	A young tree which is no longer a seedling but not yet a pole. As used in the HCP, trees from 2.01 to 5.0 inches dbh.
Scour	The erosion of stream bed and/or banks caused by flood water in a river or stream.
Screw traps	A mechanism for trapping juvenile fish, usually downstream migrants, by which the fish are pulled into a live box by a large screw mechanism that turns by the force of the water.
Second-growth	Forest stands in the process of regrowth after an earlier cutting or disturbance.
Semelparous	In general, applies to species in which individuals breed only once in their lifetimes. Applies to salmonids that die after spawning, such as do all of the Pacific salmon species.
Sensitive soil	Soils with moderate or high flood hazard potential, or slow or very slow drainage rates, or that are formed in place (organics), or that are alluvial soils.
Sensitive species, state	A wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or the removal of threats. Sensitive species are legally designated in WAC 232-12-011 and defined in WAC 232-12-297 Section 2.6.
Seral stage	A particular stage (ecological community) in a sere, or pattern of succession. As used in the HCP, applies to forest succession

Sidecast	Excavated material that has been moved to the side and deposited within the limits of construction for a road or landing (for collecting lags during timber harvest), or that has been dumped over the side and outside the limits of construction. Sidecasting results in over-steepened slopes that, in very steep terrain, can cause slope instability and failure under certain conditions.
Silviculture	The theory and practice of controlling the establishment, composition, growth, and quality of forest stands in order to achieve management objectives. Includes such actions as thinning, planting, fertilizing, pruning, and leaving seed trees at harvest.
Smolt	The life stage of a juvenile salmon when it migrates to saltwater, involving physiological changes that adapt an individual for the change from fresh to salt water.
Snag	A standing dead tree.
Special management area (SMA)	Areas outside the Ecological Reserve within which timber harvest and other activities will be constrained, largely so as not to encourage buildup of mammal populations that may carry pathogens potentially injurious to humans. Applied to areas with potentially the greatest chance to influence water at the Landsburg intake.
Species	A unit of the biological classification system (taxonomic system) below the level of genus; a group of individual plants or animals (including subspecies and populations) that have common attributes and are capable of interbreeding. The federal Endangered Species Act defines species to include subspecies and any distinct population segment of any species that interbreeds when mature.
Species of concern	As used in the HCP, any species addressed by the HCP and whose conservation strategies are taken into account by the HCP.
Species of concern, federal	An unofficial status designation given a species which appears to be in jeopardy, but for which insufficient information exists to support listing.
Species of concern, state	Those species listed as state endangered, state threatened, state sensitive, or state candidate, as well as species listed or proposed for listing by the Secretary of Interior or Secretary of Commerce.



Species of greatest concern	As used in the HCP, 14 species addressed by the HCP that are currently listed under the Endangered Species Act or otherwise are believed to be at significant risk in the region.
Stand (forest stand)	A group of trees that possess sufficient uniformity in composition, structure, age, spatial arrangement, or condition to distinguish them from adjacent groups of trees.
Stand regenerating harvest	See “Regeneration harvest.”
State Environmental Policy Act (SEPA)	The state law that requires all state and local government agencies to consider and analyze the adverse environmental impacts of any action proposed by those agencies, to inform and involve the public in the agency’s decision-making process, and to consider the environmental impacts in the agency’s decision-making process.
Stem or Competitive Exclusion	The competitive exclusion stage is described as the phase of forest development when trees fully occupy the site and compete with one another and other plants for light, water, nutrients, and space to the point where most other vegetation and many trees become oppressed and die.
Stock	The group of fish spawning in particular lake(s) or stream(s) at a particular season that to a substantial degree do not interbreed with any group spawning in a different place, or in the same place at a different season.
Stream reach	A segment of a stream that has beginning and end points selected for some specific characteristic.
Succession	A natural replacement of one plant (and/or animal) community by another over time in the absence of disturbance.
Suitable marbled murrelet habitat	A contiguous forested area containing trees capable of providing nesting opportunities, as defined by WAC 222-16-010 (Appendix 24).
Suitable spotted owl habitat	Forest stands that meet descriptions defined in WAC 222-16-085 (Appendix 24).
Tailrace	A structure and outlet that conveys flow from a hydroelectric turbine to the river.
Tailrace rack (barrier)	A barrier that keeps fish from swimming upstream into a hydroelectric turbine.

Tainter gates	A type of gate with a circular segment for its face, rotating about its center of curvature; commonly used on dams and diversion structures to control the flow of water over and under a spillway.
Take	To harass, harm, pursue, hunt, wound, kill, trap, capture, or collect a federally listed threatened or endangered species, or to attempt to do so (ESA, Section 3[10]). Take is prohibited under federal law, except where authorized. Take may include disturbance of the listed species, nest, or habitat when disturbance is extensive enough to disrupt normal behavioral patterns for the species, although the affected individuals may not actually die. See also “Harm” and “Incidental take.”
Talus	An accumulation of rock debris at the base of a cliff or rock formation, typically forming a slope that is often unstable.
Threatened species, federal	A designation as defined in the federal Endangered Species Act for a species that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future.
Threatened species, state	A wildlife species native to the state of Washington that is likely to become endangered within the foreseeable future throughout significant portions of its range within the state without cooperative management or the removal of threats. Threatened species are legally designated in WAC 232-12-011 and defined in WAC 232-12-297 Section 2.5.
Tribe, the	The Muckleshoot Indian Tribe.
Tributary	A stream that flows into a larger stream or body of water.
Turbidity	A measure of the relative clarity of water, which may be affected by material in suspension in the water.
Turbine	The machine used to convert the energy of water into electrical energy.
Type I-III waters	In the context of the HCP, fish bearing waters. Definition based on WAC 222-16-030.
Type IV waters	Streams without fish that influence Type I-III waters under the state classification system; streams with a well-defined channel, which may be perennial or intermittent. Definition based on WAC 222-16-030.

Type V waters	Streams without fish that influence Type IV waters under the state classification system; includes streams with or without well-defined channels. Definition based on WAC 222-16-030.
Type IX waters	A stream, or potential stream, which has not yet been typed under the state classification system.
U.S. Fish and Wildlife Service (USFWS)	The federal agency that is the listing authority under the Endangered Species Act for plant and animal species other than marine mammals and anadromous fish.
Upper Municipal Watershed	That area of the Cedar River Municipal Watershed generally east of Cedar Falls which drains to the Chester Morse Lake Basin.
Up-ramping	Increases in instream flows as a result of changes in facility operations, most often expressed as a rate of increase in water elevation in inches per hour.
USGS gage	A streamflow discharge measuring station; records stage, or height, of water, which can then be converted to discharge (cfs) based on stream geometry.
Walsh Lake Diversion Ditch	An approximately 4 mile-long channel constructed in the early 1930s to redirect the drainage waters from Walsh Lake (within the Cedar River Municipal Watershed) to a point in the Cedar River downstream of the Landsburg Diversion Dam and drinking water intake structures. Also referred to as Walsh Lake Ditch or Walsh Ditch.
Washington Administrative Code (WAC)	All current, permanent rules of each state agency, adopted pursuant to chapter 34.05 RCW.
Watershed	A basin contributing water, organic matter, dissolved nutrients, and sediments to a stream, lake, or ocean. As applied in the HCP, used also to refer to the Cedar River Municipal Watershed above the Landsburg Diversion Dam and water intake, some of which does not drain into the Cedar River above the Landsburg water intake.
Watershed analysis	A cumulative effects assessment prepared for forest practices in a watershed administrative unit under the Washington State Forest Practices Act with the long-term objective of protecting and restoring public resources and the productive capacity of fish habitat affected by forest management operations; produces prescriptions for future management; completed under WAC 222-22-050 or WAC 222-20-060, with prescriptions selected under WAC 222-22-010.

Weir	See “Fish weir.”
Western Hemlock/Western Redcedar Forest - Mixed	50 to 70 percent crown closure in western hemlock or western redcedar; other species present either coniferous or deciduous.
Western Hemlock/Western Redcedar Forest - Pure	More than 75 percent crown closure in western hemlock or western redcedar; other species present either coniferous or deciduous.
Wetland	Land where the water table is usually at or near the surface or the land is covered by shallow water and has one or more of the following attributes: the land supports, at least periodically, predominantly hydrophytic plants (plants adapted to water or waterlogged soil); substrate is predominantly undrained hydric soils; and/or the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season each year.
Wild stocks	In Washington State, a fish stock that is sustained by natural spawning and rearing in the natural habitat, regardless of parentage; can include native or introduced stocks.
Wildlife reserve tree	Defective, dead, damaged, or dying tree which provides habitat for wildlife species dependent on standing trees; defined in WAC 222-16-010.
Yarding	The transport of logs from the point of felling to a collecting point or landing.

Figure G-1. Illustrations of types of timber harvest and thinning

Figure G-1a. Commercial thinning

Figure G-1b. Ecological thinning

Figure G-1c. Pre-commercial thinning

Figure G-1d. Restoration thinning

Figure G-1e. Retention harvest—clumped